

## **STUDY OF THE STRUCTURE, DISTRIBUTION AND DYNAMICS OF *CODIUM ELISABETHAE* POPULATIONS IN THE AZORIAN REEF ECOSYSTEM, USE OF SUBMARINE IMAGE ANALYSIS**

Sirjacobs D.<sup>1</sup>, F. Tempera<sup>2</sup>, F. Cardigos<sup>2</sup>, S. Gobert<sup>1</sup>, G. Lepoint<sup>1</sup>, R.S. Santos<sup>2</sup> and J.-M. Bouquegneau<sup>1</sup>

<sup>1</sup> Laboratory of Oceanology, Liège University  
B6c, Sart-Tilman, B-4000 Liège, Belgium  
E-mail: D.Sirjacobs@ulg.ac.be

<sup>2</sup> Department of Oceanography and Fisheries, University of the Azores  
PT- 9901-862 Horta, Azores, Portugal

In the context of the Network Natura 2000, several Sites of Community Interest (SCI) were established within the Azores archipelago. In the SCI of Monte-da-Guia (south-eastern coast of Faial), two study sites were delimited in order to investigate particularly the links between habitat characteristics, population structure, distribution and dynamics of the green alga *Codium elisabethae*. The first site is a large protected rocky seafloor of an ancient volcano crater (20m deep), today half opened to the sea, and classified as integral reserve. It shows very high density stands of *Codium elisabethae* (about 105 individuals.m<sup>-2</sup>), representing the main vegetal biomass. At similar depth, but at a distance of about two kilometers, the second site is situated in a more exposed area, where a sparse population (about 13 individuals.m<sup>-2</sup>) occupies rocky tables and boulders emerging from shallow sandy deposits. These contrasting densities reflect a different population dynamic equilibrium resulting from the particular environmental pressures of each site. In order to understand the differences of population structure, distributions and dynamics with regard to the characteristics of their habitat, a two-year monthly survey was started in August 2003. These surveys consist in building submarine image mosaics of each site (Salgado *et al.*, 2001). Further, a post-processing computer assisted detection is run on the images allowing to derive valuable information about the *Codium elisabethae* present (number of individuals, size histogram of the population, proportion of the rocky substrate occupied by the algae). This technique allows to study a comparatively large zone regarding to the diving time invested. Efforts were also invested *in situ* to count and measure the size of both young recruits resulting from the winter sexual reproduction and also these resulting from gemmating. In the near future, sensors will be installed to follow some environmental parameters such as temperature, currents and light conditions in each site, whereas different sampling campaigns will be devoted to quantify nutrients concentrations, both in the water close to the sea-bed, and in the internal volume of sea water isolated by the spherical thallus of *Codium elisabethae* (space also called the lumen). Based on previous studies (Vaqué *et al.*, 1994; Vidondo and Duarte, 1995), it can be suggested that the lumen of this algae trap and concentrate nutrients from the ambient water and shelter a very dense micro-heterotrophic community, as compared to the outer environment. These characteristics are particularly interesting as they show how important can be the links between the spatial variations of benthic habitat characteristics, the structure and dynamics of the *Codium elisabethae* populations and the role they may play on the local capture and release of nutrients at the scale of these oligotrophic reef ecosystems.

## References

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